

REMARKS

This is in response to the outstanding Office Action dated September 24, 2009. To summarize, Claims 2, 4 and 5 are amended herein solely for clarification purposes, and Claims 6-11 are added. Further, the specification is amended herein to correct grammatical and typographical-type errors, and to insert the proper application headings.

Applicants appreciate the indication of allowable subject matter in Claim 4. Claim 4 has accordingly been rewritten herein into independent form as newly-added Claim 11.

Claims 1-3 and 5 stand rejected under 35 USC §102 as anticipated by U.S. Patent No. 6 049 065 (Konishi). Konishi '065 is directed to a glow plug having a metal sheath 1 and a cylindrical metal shell 2 which retains a rear portion of sheath 1. A ceramic heater 3 is provided in metal sheath 1, and has a ceramic body 31 embedding therein lead wires 33 and 34 as well as a U-shaped resistor 32. One of these lead wires (33 as shown in Figure 1) is connected to a terminal electrode 4 via a metal cap 52 which seats over a rear end of heater 3.

Claim 1 recites "an electrode lead-out member which is connected to one electrode of the ceramic heater at a connecting portion, the connecting portion being disposed inside of the metallic outer sleeve", and "a granulated powder of a low rigidity and made of an inorganic insulating material is disposed to fill the metallic outer sleeve externally around the connecting portion of the ceramic heater and the electrode lead-out member". While the '065 reference does teach a connection between the distal end of the metal cap 52 and the lead wire 33 embedded in ceramic heater 3 (see Figure 1), there is clearly no granulated powder disposed to fill metal shell 2 externally around this connection. While '065 discloses various ways of making ceramic heater 3 and various materials which may be used, there is no disclosure in this reference of any granulated powder of a low rigidity and made

of an inorganic insulating material disposed to fill shell 2 externally around the connection between lead wire 33 of heater 3 and cap 52. Further, Claim 1 recites "an insulating material of a polycrystalline solid having a high rigidity and disposed to fill in the metallic outer sleeve as a sealing material". As understood, there is no such insulating material disposed in metal shell 2 or sheath 1.

In view of the above, Claim 1 is believed allowable over Konishi '065.

Claims 2, 3 and 5 depend from what is believed to be an allowable Claim 1, are believed allowable therewith, and include additional features which further distinguish over Konishi '065.

Claim 6 is directed to a ceramic heater-type glow plug and recites:

"a ceramic heater element having a body portion and an electrode;

a metallic outer sleeve having a hollow interior, a distal end portion in which said ceramic heater element is disposed, and a proximal end portion configured for being fixed within a housing of an engine;

an electrode lead-out member connected to said electrode at a connection area disposed within said hollow interior of said metallic outer sleeve;

a granulated powder of a low rigidity and made of an inorganic insulating material disposed in said hollow interior of said metallic outer sleeve externally around said connection area; and

an insulating material of a high rigidity disposed in substantially all remaining areas of said hollow interior of said metallic outer sleeve."

As discussed above relative to Claim 1, the '065 reference does not teach disposing granulated powder externally around the connection area between metal cap 52 and

lead wire 33 of heater 3. While '065 discloses various methods of making ceramic heater 3 and various materials which may be used for ceramic heater 3, there is no disclosure in this reference of any granulated powder of a low rigidity and made of an inorganic insulating material disposed in the hollow interior of shell 2 externally around the connection between lead wire 33 of heater 3 and cap 52. Further, '065 does not teach an insulating material of a high rigidity disposed in substantially all remaining areas of the hollow interior of sheath 1 or shell 2. Claim 6 is accordingly believed allowable as presented.

Claims 7-10 depend from what is believed to be an allowable Claim 6, are believed allowable therewith, and include additional features which further distinguish over the '065 reference. For example, Claim 7 recites "said insulating material is disposed externally of said body portion". As understood, there is no such insulating material disposed externally of the ceramic heater 3 in the '065 reference.

Further, Claim 8 recites "said ceramic heater element has a distal end which projects beyond said distal end portion of said metallic outer sleeve and a proximal end disposed in said distal end portion of said metallic outer sleeve, said proximal end of said ceramic heater element having a reduced-diameter portion forming part of said connection area between said electrode lead-out member and said electrode, said granulated powder being disposed around said reduced-diameter portion between an interior surface of said metallic outer sleeve and said reduced-diameter portion". The '065 reference does not show any such reduced-diameter portion on the proximal end of ceramic heater 3, and no granulated powder disposed around such a portion between an interior surface of shell 2 and the connection between cap 52 and lead wire 33.

Additionally, Claim 9 recites "said ceramic heater element has a distal end which projects from said distal end

portion of said metallic outer sleeve and a proximal end disposed in said distal end portion of said metallic outer sleeve, said proximal end of said ceramic heater element having a diameter less than an interior diameter of said distal end portion of said metallic outer sleeve such that an annular space is defined substantially radially between said proximal end of said ceramic heater element and said metallic outer sleeve, said granulated powder being disposed in the annular space". The '065 reference does not include any granulated powder disposed in an annular space defined substantially radially between the proximal end of ceramic heater 3 and shell 2.

In view of the above, the instant application is believed in condition for allowance, and action toward that end is respectfully requested.

Respectfully submitted,

For 
Terryence F. Chapman

TFC/LLC/ad/ps

FLYNN, THIEL, BOUTELL	David G. Boutell	Reg. No. 25 072
& TANIS, P.C.	Terryence F. Chapman	Reg. No. 32 549
2026 Rambling Road	Mark L. Maki	Reg. No. 36 589
Kalamazoo, MI 49008-1631	Liane L. Churney	Reg. No. 40 694
Phone: (269) 381-1156	Brian R. Tumm	Reg. No. 36 328
Fax: (269) 381-5465	Heon Jekal	Reg. No. 64 219
	Eugene J. Rath III	Reg. No. 42 094
	Dale H. Thiel	Reg. No. 24 323
	Sidney B. Williams, Jr.	Reg. No. 24 949

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